Vol. 65, pp. 1-12 January 29, 1952

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SOME NEW AMPHIBIANS FROM GUATEMALA

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During the course of the past few years the writer has either personally collected or received for study from other institutions some Guatemalan amphibians which appear to be undescribed. Three of these specimens belong to the difficult genus *Oedipina* Keferstein. It is with some misgivings that they are herein assigned to two new species. Two other specimens have been in the writer's collection for some time, and, though he has recognized them as belonging to an undescribed species of *Magnadigita* Taylor, he has hesitated to record them owing to their rather poor state of preservation. Inasmuch as there seems to be little possibility that further material of the same species will be forthcoming for some time, it seems best that they be described now. A single specimen of a very distinct *Plectrohyla* Brocchi and a fine series of *Hypopachus* Keferstein both new to science were secured by the writer in 1949.

The first species to be described, an *Oedipina*, is named for its geographic locale, the slopes of Volcán Fuego. It may be known as

Oedipina ignea new species

Holotype.—United States National Museum, No. 127959. An apparently adult female collected in 1948 by Mr. Herbert Delmat along the Río Las Brisas, just south of Yepocapa, Department of Chimaltenango, Guatemala. Elevation, about 1450 meters.

Diagnosis.—An *Oedipina* very close to *O. alfaroi* Dunn from which it differs in its blue-black rather than brown coloration, its somewhat less completely webbed digits, its slightly longer legs, and its slightly longer head in comparison with its head-body length.

Description of holotype.—Body form slender. Snout blunt but not strongly so; overlapping the lower jaw only moderately. Horizontal diameter of the eye almost equal to the snout-eye distance. Loreal region not depressed. Canthus and top of snout rounded. A slight depression (possibly owing to preservation) just anterior to the eye and another to the parietal region.

A canal commencing at the posterior corner of the eye curves sharply dorsally and then extends posteriorly along the side of the head to the gular fold. Another canal that bends sharply posteriorly medially crosses the chin and connects the corners of the mouth. From this two other

canals extend forward on either side of the chin and join anteriorly. Short canals on either side of the head extend dorsally from the corners of the mouth to the lateral head canal. Two short canals extend from the nostrils down onto the upper lip.

Maxillae toothed. Vomerine teeth on low ridges that curve backwards from behind the choanae and almost join medially. A maximum of 10 vomerine teeth on each ridge (right side.) Parasphenoids (paravomerines) heavily toothed, not separated medially and extending forward almost to the vomerines. None of the premaxillary teeth pierces the lip. Sublingual fold well developed.

Nineteen costal grooves between arm and leg insertions. Thirteen costal grooves separating the arms and legs when adpressed. Digits slightly rounded; all connected by webs which do not quite extend to the tips of the most distal phalanges. Constriction at base of tail barely evident.

Color, gun-metal blue above and slightly lighter below. The nasal region and the area around the arm and leg insertions somewhat lightened. A light gland-like spot just posterior to the groin.

Snout to base of tail, 56.5 mm.; tail, incomplete; tip of snout to gular fold, 7.5 mm.; head width at angle of jaws, 4.5 mm.

While at Yepocapa in 1949 there was brought to me a fragment of an *Oedipina* obviously the same as that described above. This fragment consists of a body and four legs. It has but 18 costal grooves between arm and leg insertions and but 11.5 grooves separating the adpressed limbs. In color it resembles the type. It was collected in the mulch of a coffee grove seven kilometers by road south of Yepocapa at an elevation of 1350 meters.

It is not improbable that Guatemalan material described and figured by Brocchi[1] under the name "*Spelerpes vermicularis* Gray" is of this new species. Mr. Jean Guibé of the Museum National d'Histoire Naturelle informs me that Brocchi's material consisted of four specimens. All have 18 costal grooves and I estimate from Mr. Guibé's measurements that the adpressed legs are separated by about 10.5 costal grooves in the two larger individuals and by about 9 in the two smaller ones.

A second new species of the genus *Oedipina* I name for Dr. Edward H. Taylor of the University of Kansas whose investigations have opened up new lines of research on the difficult Mexican and Central American Plethodontids.

Oedipina taylori new species

Holotype.—Museum of Zoology, University of Michigan, No. 102281. An adult male collected on May 28, 1949 by L. C. Stuart 4 kilometers east of Hacienda La Trinidad (23 air-line kilometers southeast of Chiquimulilla), Department of Jutiapa, Guatemala. Elevation, about 100 meters.

Diagnosis.—An *Oedipina* apparently most closely allied to *O. alfaroi* Dunn from which it may be distinguished by the absence of webs between the outer phalanges of all digits except I on both the hands and feet and by a reduction in the number of vomerine teeth.

Description of holotype.—Body form slender. Snout narrowly rounded and strongly projecting over the lower jaw. Horizontal diameter of the

[1]Brocchi, P., Miss. Sci. Mex., Etudes Batr., 1883: 118, Pl. 20, Fig. 1.

eye considerably less than the snout-eye distance. Loreal region depressed as is the anterior portion of the upper surface of the head. The canthus thus remains elevated and rounded.

A canal commencing in the supraocular region descends behind the eye to the eye corner and thense backwards along the side of the head to the gular fold. A short, barely visible nuchal canal extending dorsally from the gular fold. Gular fold prominent. A weak fold, curved backwards medially, connects the angles of the jaws on either side and from it a short canal extends dorsally and crosses the lateral head canal. Laterally, on either side, a canal extends forward from this weak fold to the tip of the lower jaw and these canals are joined at about the level of the eye by a weak transverse canal. Extending backwards on either side from the same weak fold are two short canals which do not quite reach the gular fold. A canal from each nostril down onto the maxillary protuberance on each side of the snout.

Upper lip pierced by two premaxillary teeth. Maxillae not toothed. Vomerine teeth on transverse ridges that curve backwards medially and lie at the level of the choanae. A maximum of five vomerine teeth (right side.) Parasphenoids (paravomerines) well toothed and extending forward to below the center of the eyes; separated medially by a narrow channel. Sublingual fold barely evident.

Twenty costal grooves between the arm and leg insertions; the most posterior groove barely indicated. Legs and arms short, separated by 15 costal grooves when adpressed . Digits rounded; the terminal phalanx on fingers II-III-IV and on toes II-III-IV free. No constriction at the base of the tail.

Color above and below, gun-metal blue. The snout, arms and legs, the cloacal region, and the area around the arm and leg insertions somewhat lighter. A light spot behind the leg insertion.

Snout to base of tail, 55 mm.; tail incomplete but originally probably several times the head-body length; head to gular fold, 7.4 mm.; head width at angles of jaws, 4.3 mm.

The holotype was collected from beneath a rotting log in an open forest. Intensive search in the immediate area failed to reveal further specimens.

In 1944 while at Jutiapa, Department of Jutiapa, Guatemala (elevation, about 900 meters) a local physician presented me with a specimen of *Oedipina* which may belong to this species. It had been preserved in very strong formalin and is in a very desiccated condition. The specimen had been collected in the rubble of a ruined *ranchito* on the outskirts of the village. Insofar as I am able to determine, the specimen, a female No. 98125 in the collections of the Museum of Zoology, University of Michigan, is identical with the holotype of *taylori* except that it possesses maxillary teeth and is dark brown in color. Because of the presence of maxillary teeth, the variability of which is but poorly understood in the genus, I do not designate this specimen a paratype, though I do refer it to *taylori* provisionally.

Inasmuch as I have but little experience with the genus *Oedopina* either in the field or in the laboratory, I have had to rely upon descriptions in the literature and upon notes supplied me by my colleagues Drs. E. R. Dunn and Edward H. Taylor. Both agree, oddly enough, that the above species are distinct. Insofar as *taylori* is concerned I am

in accord with them, but *ignea* seems to me so close to some of the forms described from southern Central America that I am not too certain it may not prove to be conspecific with one of them.

Two specimens of a salamander stemming from the Sierra de los Cuchumatanes of southwestern Guatemala prove to be a very distinct new form of *Magnadigita.* Turning again to geographic locale for a specific name, I designate them

Magnadigita omniumsanctorum new species

Holotype.—Museum of Zoology, University of Michigan, No. 102285. An adult female collected by Raymond Stadelman at Todos Santos, Department of Huehuetenango, Guatemala. Elevation, about 2500 meters. Collected probably in April of 1937.

Paratype.—Museum of Zoology, University of Michigan, No. 102286. An adult female collected with the holotype.

Diagnosis.—A *Magnadigita* obviously related to *M. morio* (Cope) from which it differs in possessing shorter legs, darker coloration both dorsally and ventrally, and possibly a few more vomerine teeth.

Description of holotype.—Body form robust. Snout narrowly rounded and relatively short. Horizontal diameter of eye almost equal to the snout-eye distance. Loreal region not depressed; canthus rounded; mouth oval in outline; greatest width of head at angle of jaws. Nostrils small; a barely visible naso-labial groove. Labial protuberances beneath nostrils distinct but only moderately developed. A well developed gular fold that appears to extend upwards onto the sides and ends on the shoulders. An ill-defined chin-groove continues dorsally onto the sides of the head behind the angle of the jaws. No other head grooves indicated.

Costal grooves well defined; 13 between the limb insertions. Digits rounded at the tips and webbed except the outer two phalanges of toes II, III, and IV and fingers II and III. Basal constriction of tail very distinct. Combined lengths of arm and leg from insertion to tip of longest digit equal to 77 per cent of the axilla-groin measurement.

Vomerine teeth irregularly arranged on ridges that extend medially and posteriorly in a sweeping curve from outside and behind the choanae; almost joining medially. Vomerine teeth about 12 on each side. A large, arrow-shaped patch of parasphenoid (paravomerine) teeth, not broken medially, and extending forward almost to the vomerine ridges. Maxillae toothed to mid-eye level. Tongue almost heart-shaped and barely one-third the width of the lower jaw.

Head length to gular fold, 14 mm.; head width at angle of jaws, 10 mm.; head-body length, 63 mm.; tail length, 43 mm.

Entire dorsal surface dark brown. Sides lighter and heavily flecked with white. Undersurfaces light brown powdered with white; the throat and chin somewhat lighter than the belly. Limbs brown, flecked with white above and marbled brown and white below.

Paratype.—The paratype is like the holotype in all essential details. It is somewhat larger, with a head-body length of 73 mm. Limbs somewhat shorter, combined lengths of limbs equal to but 70 per cent of the axilla-groin measurement. Owing to poorer preservation the teeth are more readily counted than in the holotype. Twenty-nine teeth on the maxilla, 13 vomerine teeth on each side, and 6 teeth on the premaxilla.

In the irregular arrangement of the vomerine teeth, in coloration, and in habits this species is obviously related to *Magnadigita morio*. Both are apparently ground forms in the oak-pine zone of southwestern Guatemala. *Magnadigita morio* seems to be restricted to oak forest at elevations of from about 1800 to 2500 meters on the Plateau of Guatemala. *Magnadigita omniumsanctorum*, though known only from the type locality, is probably distributed throughout the Sierra de los Cuchumatanes to the north of the Plateau. The types were secured from beneath a log in a corn field.

My studies on Guatemalan species of the genus *Magnadigita* lead me to believe that the genus may be broken down into at least three groups. One, which in previous publications I have refered to as the *dunni* group, includes a number of small species. They are all characterized as having flattened rostra which, when viewed from above, are almost straight across between the nostrils. The eyes are large and protruding, a single phalanx of the longest toe is free of a web, and in color they are all streaked and striped with shades of brown and red. All, insofar as is known, are bromeliad inhabitants at intermediate elevations (1500-2500 meters.) Species of the *morio* group are robust forms of moderate size and with rounded rostra. The eyes are smaller than in species of the *dunni* group and are less protruding. Two phalanges of the longest toe are free from the web, and the vomerine teeth are irregular in arrangement, often approaching an echelon type of arrangement. They are mottled brown and white and flecked with white. They are ground forms. A third group may be designated the *franklini* group. These species are also robust and of moderate size though larger than those of the *morio* group. In this group the snout is rounded, the eyes are of moderate size, two phalanges of the longest toe are free from the web, and the vomerine teeth are regularly arranged on the bone. All species are brightly colored with shades of red and yellow and are either spotted or possess a distinct dorsal stripe. They are bromeliad forms.

Insofar as I have had experience with the various species, I would suggest the following arrangement:

dunni group

dunni, engelhardti, cuchumatana, and *helmrichi.* I do not know *robusta, subpalmata,* or *macrinii,* but from descriptions I believe that they may be placed in this group. Here also may be placed *adspersa* though it is said to lack a prefrontal bone.

franklini group

franklini, lincolni, and *nigroflavescens.* I believe that Taylor[2] should have compared the last with *franklini* rather than *engelhardti.*

morio group, *morio* and *omniumsanctorum.*

Two other species with which I am familiar do not fit into this scheme in all details. *Magnadigita rostrata* is morphologically like members of the *dunni* group, but differs in habits, being confined to high elevations (above 2800 meters) and living beneath logs rather than in bromeliads. It is possible that the absence or sparcity of bromeliads at such elevations may have forced the species to retain its terrestrial habits. Only in the Cuchumatán Mountains does it overlap the range of any other

[2]Taylor, Edward H., New Amphibians from the Hobart M. Smith Mexican Collections. Univ. Kansas Science Bull., 27, 1941: 150-152, Pl. 8, Pl. 9, Figs. 9-10.

species of the *dunni* group and even there it occurs well above the upper limits of *cuchumatana*. I am inclined to place it in the *dunni* group.

Magnadigita flavimembris is certainly very like species of the *franklini* group. Taylor,[3] however, has pointed out that it possesses a type of hand and foot unlike other members of the entire genus. Furthermore it is terrestrial rather than a bromeliad inhabitant, and, though geographically coincident with *franklini*, it is ecologically distinct. It may be assigned to the *franklini* group provisionally.

It should be noted that the above arrangement is merely a suggestion based upon a rather superficial consideration of the genus. It is presented at this time merely because it is felt that it may be of some value to other investigators working with the genus but lacking material from Guatemala where *Magnadigita* appears to be centered and may, indeed, have originated.

To the growing list of species assigned to the hylid genus *Plectrohyla* I add, with apologies, yet another. It may be called

Plectrohyla avia new species

Holotype.—Museum of Zoology, University of Michigan, No. 102280. An adult male collected in scrubby second-growth on April 21, 1949 by L. C. Stuart at Granaja Lorena (about 10 air-line kilometers northwest of Colomba), Department of Quezaltenango, Guatemala. Elevation, about 1750 meters.

Diagnosis.—A *Plectrohyla* of spectacularly large size with a simple prepollex, lacking vocal slits, and with a visible tympanum. Differing from its apparently closest relative, *Plectrohyla cotzicensis*, in lacking an outer metatarsal fold.

Description of holotype.—Teeth on maxillae and premaxilla stout, 46 in number; vomerine teeth on two elevated mounds between choanae and somewhat closer together than their distance from the choanae. Tongue very large, almost filling the lower jaw, oval in outline and rounded behind.

Head short, broader than long. Rostrum not pointed nor with a keel. Canthus almost fold-like, producing a marked depression in the loreal region. Nostrils almost terminal and slightly elevated above surrounding snout surface. Tympanum small but very distinct, its horizontal diameter slightly less than the horizontal diameter of the eye. A heavy, glandular supratympanic fold that continues forward above the eye and merges with the fold-like canthus.

Skin on the upper surface of the head and hands, finely tuberculate; skin of remaining upper surfaces, smooth. Arms strongly developed, lacking either fold or row of tubercles on the fore-arm. Digit I with a simple, horny prepollex. Palmar tubercles conspicuous but compared with other members of the genus only moderately developed. A trace of a web between the fingers. Terminal disks of fingers well developed and considerably larger than the tympanum. Belly coarsely granular; chest smooth, with an indication of a transverse fold. Chin almost smooth with but a few scattered granules.

Legs normally developed. A low, poorly developed inner metatarsal ridge; no outer metatarsal ridge. Foot tubercles conspicuous but not

[3]Taylor, Edward H., The Genera of Plethodont Salamanders in Mexico, Pt. I. Univ. Kansas Science Bull., 30, 1944: Pl. 14, Fig. 8.

overly developed. Under surface of thighs coarsely tuberculate as is the anal region. No trace of an anal flap or enlarged subanal tubercles.

Webbing on the toes difficult of description owing to the presence of a lateral dermal fringe on the toes with which the web merges. Digit I webbed to the tip on its outer side; digit II with one phalanx free on its inner side and webbed to the tip on its outer side; digit III with one phalanx free on its inner side and with one-half phalanx free on its outer side; digit IV with one phalanx free on both sides; digit V webbed to the tip on its inner side.

Color above, blue-gray with no trace of pattern; undersurfaces immaculate, varying from dirty yellow to greenish white.

Head-body length, 86 mm.; head width at angle of jaws, 30 mm.; tip of snout to angle of jaw, 25 mm.; tip to snout to eye, 7 mm.; anus to heel, 76 mm.; heel to tip of digit IV, 66 mm.

In lacking vocal slits this species agrees with both *Plectrohyla guatemalensis* Brocchi and *P. cotzicensis* Stuart. This character may be an indication of phylogenetic relationship between the three species. At the same time associated with these three species there have always been found tadpoles of "x" type of Stuart.[4] Though it can not be proven that tadpoles of this type secured in the streams at Lorena belong to *P. avia*, the observation is suggestive. In the same streams tadpoles of *P. sagorum* were abundant and adults of the species were not uncommon in bromeliads.

During a brief visit to Dueñas, a locality made famous by Godman and Salvin, I secured in the summer of 1949 specimens of a species of *Hypopachus* which I have been unable to allocate. For Volcán Agua which dominates the Antigua Basin in which Dueñas is situated I name this apparently new form

Hypopachus aquae new species

Holotype.—Museum of Zoology, University of Michigan, No. 102282. An adult male collected on July 21, 1949 by L. C. Stuart in the coffee groves of Finca San Rafael on the outskirts of Dueñas, Department of Sacatepequez, Guatemala. Elevation, about 1475 meters.

Paratypes.—Museum of Zoology, University of Michigan, Nos. 102283-4 (34 specimens) all collected in the same general vicinity of the holotype on the same day or during the course of the previous day.

Diagnosis.—A *Hypopachus* of the *inguinalis* group (rounded outer metatarsal tubercle), readily distinguished from *simus*, *inguinalis*, and *barberi* by the greatly reduced webbing between its toes and from *globulosus*, apparently its closest relative, by its longer leg, (coccyx to heel 87-96 per cent of head-body length in *aquae*, 82 per cent in the type of *globulosus*) bolder ventral pattern, and wartier dorsum.

Description of holotype.—Snout narrowly rounded rather than truncate; slightly longer than the horizontal diameter of the eye. Canthus rounded; loreal region very slightly concave. Interorbital distance equal to the length of the eye-lid. Fingers free; comparative lengths, III-IV-II-I. Subarticular tubercles prominent; three low palmar tubercles. Toes with just a trace of a web; comparative lengths, IV-III-V-II-I. Sub-

[4]Stuart, L. C., Descriptions of Two New Species of *Plectrohyla* Brocchi with Comments on Several Forms of Tadpoles. Occ. Pap. Mus. Zool., Univ. Michigan, 455, 1942: 8-9, Figs. 1-2.

articular tubercles of toes less prominent than those of fingers. Two metatarsal tubercles, the inner slightly compressed, the outer rounded. The former not strongly developed as in some species (*simus* especially.) Heels failing to meet when legs are adpressed posteriorly. Skin leathery, smooth beneath and somewhat warty above. A deep groove extending from the posterior corner of the eye downwards and backwards to the arm insertion. This groove gives the impression of the presence of a glandular ridge just below it. A faint canal extending across the throat just behind the angle of the jaws gives the illusion of a gular fold. Another such canal across the chest between the arm insertions marks the position of a chest fold which is present in many of the paratypes. An inconspicuous fold across the head just behind the eyes. Tongue rounded, almost filling the jaws. Vocal slits on either side at the edge of the tongue and just behind the angle of the jaws.

Snout to tip of coccyx, 30.8 mm.; tip of snout to interocular fold, 5.0 mm.; eye to tip of snout, 3.3 mm.; horizontal diameter of eye, 2.7 mm.; tip of snout to gular canal, 5.9 mm.; tip of snout to canal marking position of chest fold, 11.6 mm.; tip of coccyx to outer metatarsal tubercle, 27.1 mm.; outer metatarsal tubercle to tip of toe IV, 15.0 mm.

In spirits the ground color of the dorsum is grayish brown. A darker dorsal area with irregular black borders commences at the snout and expands posteriorly and laterally to the groin. Warts within this area quite dark, producing a blotched appearance. A narrow, diffused, light line extending middorsally from the snout to the anus. A broad light streak below the lateral head canal extends from the posterior corner of the eye to the angles of the jaws. Above this on either side is a dark, subtriangular spot mottled gray-brown and black that extends from the posterior corner of the eye to the arm insertions. Arms somewhat lighter than dorsal ground color with black spots on the upper surface of the upper arms and with dark mottlings on the upper surface of the lower arms and hands. Ground color of legs like that of dorsum. Two black bars across mid-thighs which when the legs are adpressed fall in line with two similar bars on the lower legs and with two black spots, one on the tarsus and the other on the upper surface of the foot. Dark fleckings with no regular arrangement on the sides and upper surfaces of the legs. Under surfaces of the arms, legs, and belly a dirty white with broad, bold, black reticulations. Chest, throat, and chin, white with fine, black reticulations which give them a speckled appearance.

The paratypes are like the holotype in all essential details. In some individuals a pair of very fine, light lines are discernible, extending from the anus dorsally and then laterally onto the legs to the under side of the knee. In the majority there is also a trace of a fine, light line midventrally from the tip of the lower jaw onto the chest but disappearing before reaching the belly. In occasional specimens there is another faint, light line on either side, commencing at the midventral line on the chest and extending laterally to the arm insertions. In all, the very bold, ventral reticulations are characteristic, and the throat of all but one or two show the fine, dark reticulations present in the holotype. This last feature is unique in the *inguinalis* group except in occasional specimens of other species.

Collected in the mulch of coffee groves in late July, this species had apparently completed its breeding activities. In pools in an adjacent

swampy meadow tadpoles in stages varying from extremely young ones to those in which the fore-legs were about ready to appear externally were abundant.

Acknowledgements.—For aid and advice accorded me during my course of studying the above material I wish to express my thanks to Dr. Edward H. Taylor of the University of Kansas, Dr. E. R. Dunn of Haverford College, and to Drs. Norman E. Hartweg and Charles F. Walker of the University of Michigan. I am indebted to the authorities of the United States National Museum, especially Dr. Doris Cochran, for permission to describe *Oedipina ignea*. My field studies were made possible through grants from the Horace H. Rackham School of Graduate Studies, University of Michigan.